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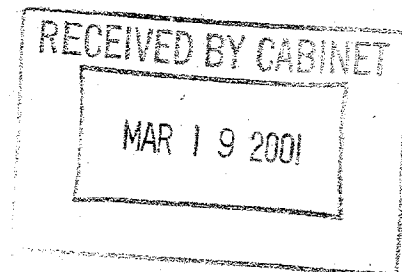
State of California
California Environmental Protection Agency

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Air Resources Board | Department of Pesticide Regulation | Department of Toxic Substances Control
Integrated Waste Management Board | Office of Environmental Health Hazard Assessment | State Water Resources Control Board | Regional Water Quality Control Board

REQUEST FOR REPORT APPROVAL
(REVISED)



CAB000-2152

TO: FILE

ATTN: Susan P. Kennedy
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FROM: Winston H. Hickox
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DATE: MAR 16 2001

SUBJECT: COASTAL WATER QUALITY MONITORING

REPORT TITLE: COMPREHENSIVE COASTAL WATER QUALITY MONITORING
PROGRAM REPORT TO THE LEGISLATURE PURSUANT TO
AB 1429

AUTHORITY/MANDATE: Water Code Section 13181 (AB 1429, Chapter 899,
Statutes of 1997)

FREQUENCY: One Time

DUE TO LEGISLATURE: January 1, 2001

POLICY ISSUES ADDRESSED: Note: The attached report has been revised from the prior submittal to meet concerns raised by the Department of Finance. AB 1429 requires the State Water Resources Control Board (SWRCB) to submit to the Legislature, not later than January 1, 2001, a report that proposes the implementation of a comprehensive program to monitor the quality of the State's coastal waters. The proposed monitoring program must address specific pollutants, including bacteria and viruses, petroleum hydrocarbons, heavy metals, and pesticides. The statute also

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PROGRAM

requires that the proposed program utilize available information and avoid the duplication of existing and ongoing monitoring efforts to the extent feasible. The proposed program must include all of the following:

1. A determination of the extent to which water quality objectives are being met.
2. Sources of pollution where water quality objectives are not being met.
3. Methods for determining changes in coastal water quality over time.
4. An estimate of the total discharge of pollutants from all sources into coastal watersheds, bays, estuaries, and coastal waters.
5. Standard protocols for sampling and data collection.
6. A standard format for reporting monitoring results.
7. An estimate of program costs and an implementation schedule.
8. A method to report biennially to the public on coastal water quality.
9. Recommended actions to maintain and improve coastal water quality.
10. A description of the methods to be used to monitor the mass emissions from storm water.

Subsequent to the passage of AB 1429 in 1997, AB 982 was enacted in 1999. AB 982 requires the SWRCB to assess and report to the Legislature on the State's monitoring programs and to prepare a proposal for a statewide comprehensive surface water quality monitoring program. The SWRCB's Proposal for a Comprehensive Surface Water Ambient Monitoring Program (SWAMP) is currently being reviewed by the Governor's Office. Because the implementation of the coastal water monitoring portion of SWAMP is a part of this proposed program, this report should not be submitted until the SWAMP report has been submitted to the Legislature.

Although SWAMP contains a coastal water monitoring component, its primary focus is on inland waters. For coastal waters, SWAMP proposes using probabilistic monitoring on a five-year rotating basis. This approach will provide ambient water quality information on coastal waters and will establish trends in water quality. However, it will not produce other specific information required by AB 1429, such as source identification and pollutants related to storm water emission.

This report proposes a comprehensive coastal water quality monitoring and assessment program. In addition to the ambient coastal water monitoring recommended in SWAMP, this proposed program also contains the continuation of various existing monitoring programs for coastal water monitoring, as well as new activities to improve the State's ability to monitor and assess the impact of storm water runoff on coastal water quality.

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For the purposes of this report, the SWRCB contracted with the Southern California Coastal Water Research Project (SCCWRP), the San Francisco Estuary Institute (SFEI), and the San Jose State University's Moss Landing Marine Laboratory to study pollutant mass emissions and storm water discharge (SCCWRP Study). The study recommends 14 activities necessary to fill data gaps, improve load estimates, and improve storm water monitoring. These actions are essential to satisfy the requirements of the comprehensive coastal water quality monitoring and assessment program established by AB 1429.

The SWRCB's current coastal water monitoring efforts are limited to the Coastal Fish Contamination Program (CFCP), the State Mussel Watch Program (SMWP), and the investigation of fecal contamination in commercial shellfish harvesting waters as required by the Shellfish Protection Act of 1993. The CFCP focuses strictly on monitoring and assessing coastal areas where sport fishing is a major activity for the assessment of human health risks. The baseline budget for CFCP is 3.0 Personnel Years (PYs) and \$324,000 for contract support by the Department of Fish and Game (DFG). In FY 2000-01, the SWRCB also committed \$143,000 in contract funds to the Office of Environmental Health Hazard Assessment (OEHHA) to conduct human health risk assessments and develop health advisories. The SMWP monitors and evaluates the occurrence of toxic substances in the State's bays, harbors, and estuaries through the analysis of transplanted and resident mussels and clams. The annual budget for SMWP consists of 2.3 PYs and \$250,000 in contract support provided by DFG. In addition to the CFCP and SMWP, an average of \$100,000 in contract funds is expended annually for studies of bacterial contamination in shellfish harvesting waters. These existing programs have produced information to answer specific questions concerning health risks related to fish consumption. While they provide a snapshot of water quality conditions in areas monitored, they do not provide a comprehensive overview of the quality of the State's coastal waters, nor do they answer specific questions concerning pollutant emission loads or sources of pollution, as required by AB 1429.

In addition to the continued implementation of these existing programs, this comprehensive program also contains new activities recommended by the SCCWRP Study and the coastal water monitoring portion of the SWAMP.

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REPORT RECOMMENDATIONS: The proposed comprehensive coastal water quality monitoring program contains the following elements:

1. The coastal water monitoring component of the Surface Water Ambient Monitoring Program.

SWAMP is also designed to maximize the use of available information generated by other monitoring programs, including compliance monitoring data; regional monitoring efforts such as SCCWRP, SFEI, and the Interagency Ecological Program (IEP); and other monitoring by federal, state and local agencies, volunteer groups, and university efforts.

2. Utilization of information provided by the Clean Water Act Section 305(b) and 303(d) Programs.

The reports required by these federal programs provide a statewide overview of the extent to which existing water quality standards are being met as well as a statewide list of impaired water bodies and the pollutants causing the impairments. That information is also required by AB 1429. As additional monitoring data become available, the water quality evaluation provided by these reports will be expanded.

3. Utilization of information provided by the National Pollutant Discharge Elimination System (NPDES) self-monitoring program.

The NPDES permit program requires point source dischargers to measure pollutants in their discharges and monitor the impacts on receiving waters near the point of discharge, including coastal waters. The data collected by dischargers can be used to estimate pollutant loads from point source discharges into coastal waters.

4. Implementation of the Quality Assurance Project Plan (QAPP) prepared by the SCCWRP for the SWRCB and the national Coastal 2000 program.
5. Implementation of 61 management measures identified in the QAPP for California's Nonpoint Source (NPS) Pollution Control Program and the Best Management Practices (BMPs) prescribed in NPDES storm water permits.

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AB 1429 requires that the proposed program include recommended actions to maintain and improve coastal water quality. NPS pollution has been identified as a significant factor contributing to coastal water degradation. Implementation of these management measures will significantly reduce the impact of NPS pollution and storm water runoff on coastal waters.

6. The following 14 activities recommended by the SCCWRP Study are also included in the proposed program. These activities are necessary to fill data gaps, improve load estimates and improve storm water monitoring. For the program to be effective, it is crucial to have appropriate monitoring tools and sufficient data. Therefore, these activities are the essential part of the proposed program:

- Compile water quality data for northern and central California coastal waters, including data on storm water flows, water quality, and land use information.
- Monitor agricultural land use sites to collect data on concentration of pollutants in runoff.
- Monitor organophosphate pesticides.
- Install flow gauges at the mouths of representative coastal watersheds.
- Monitor other sources, such as atmospheric deposition.
- Develop minimum standards for detection limits statewide.
- Create a statewide watershed classification system.
- Choose a subset of watersheds for evaluation.
- Evaluate more complex watershed models that include environmental fate and transport elements.
- Conduct additional studies to assess the optimum monitoring design for addressing specific management questions.
- Form regional storm water monitoring networks to increase comparability among monitoring programs, pool resources, and share information.
- Assess the impact of storm water runoff on beneficial use.
- Refine tools that assess anthropogenic versus natural loads in storm water.
- Refine tools for assessing biological impacts in receiving waters.

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APPROVED:

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COMPREHENSIVE COASTAL WATER QUALITY MONITORING PROGRAM

REPORT TO THE LEGISLATURE

STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

JANUARY 2001

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EXECUTIVE SUMMARY

Water Code Section 13181 (Assembly Bill [AB] 1429, Chapter 899, Statutes of 1997) requires the State Water Resources Control Board (SWRCB) to submit to the Legislature, not later than January 1, 2001, a report that proposes the implementation of a comprehensive program to monitor the quality of the State's coastal waters. The law requires the proposed program to include specific information, such as an estimate of the total discharge of pollutants into coastal waters, the sources of pollution, methods for monitoring long-term changes in coastal water quality, standard protocols for sampling and data collection, actions to be undertaken to maintain and improve coastal water quality, and methods for monitoring storm water emissions, etc. It also requires the proposed program to utilize available information and to avoid duplicating existing and ongoing monitoring efforts (Appendix 1).

This report proposes a comprehensive coastal water quality monitoring and assessment program that will provide the information required by the statute. The program proposes to utilize the monitoring and assessment information provided by various existing water quality programs, including the National Pollutant Discharge Elimination System (NPDES) Permit Program and the federal Clean Water Act (CWA) Section 305(b) program. The program also proposes to utilize the information that will become available once the recently proposed Surface Water Ambient Monitoring Program (SWAMP) is implemented.

For information that could not be obtained from existing programs, such as pollutant mass emissions and storm water's contribution to the pollution, a special study was conducted and its findings and recommendations are included in this report.

The program also proposes the implementation of 61 management measures identified in the Plan for California's Nonpoint Source Pollution Control Program (NPS Plan) and implementation of the Best Management Practices (BMPs) prescribed in storm water permits, as necessary actions to maintain and improve coastal water quality.

Existing and Proposed Programs/Plans

- **State Mussel Watch Program.** The California State Mussel Watch Program provides a uniform statewide approach to the detection and evaluation of the occurrence of toxic substances in the State's bays, harbors, and estuaries. This is accomplished through the analysis of transplanted and resident mussels and clams. Information collected is used to identify waters impacted by toxic pollutants.
- **Coastal Fish Contamination Program.** The Coastal Fish Contamination Program is designed to determine whether it is safe to eat fish and shellfish from the California coastline. Fish and shellfish from coastal sport fishing areas are collected and analyzed for contaminants, and the results obtained are evaluated to determine whether issuance of a fish consumption guidance or health advisory is needed for a particular sport fishing area.

- **NPDES Self-Monitoring Program.** The NPDES permit program requires point source and selected storm water dischargers to measure pollutants in their discharges and monitor the impacts on receiving waters near the point of discharge, including coastal waters, bays, and estuaries. The data collected by dischargers can be used to estimate pollutant loads from point source discharges into coastal waters.
- **CWA Section 305(b) Program.** As required by the federal CWA Section 305(b), the SWRCB prepares a biennial report on water quality assessment that includes coastal waters of the State. The 2000 California 305(b) Report on Water Quality [305(b) Report] provides information on the extent to which existing water quality objectives, standards, and guidelines are being met (Appendix 2).
- **Surface Water Ambient Monitoring Program.** The SWRCB recently proposed a comprehensive surface water ambient monitoring program or SWAMP, pursuant to Water Code Section 13192 (AB 982, Chapter 495, Statutes of 1999). The proposed SWAMP includes monitoring and assessment methods for determining changes in inland and coastal water quality over time (Appendix 3). SWAMP contains a coastal water monitoring component which proposes using probabilistic monitoring on a five-year rotating basis. SWAMP also proposes to maximize the use of available data generated by other monitoring programs, including compliance monitoring data; regional monitoring efforts, such as SCCWRP, San Francisco Estuary Institute (SFEI), and the Interagency Ecological Program (IEP); and other monitoring by federal, State and local agencies, volunteer groups, and university efforts.
- **Plan for California's Nonpoint Source Pollution Control Program.** The NPS Plan provides a series of management measures to be implemented by nonpoint source pollution dischargers and land use regulatory and management agencies for the purpose of maintaining and improving coastal water quality (Appendix 4).

Study of Pollutant Mass Emissions and Storm Water

The SWRCB contracted with the Southern California Coastal Water Research Project (SCCWRP), SFEI, and the San Jose State University's Moss Landing Marine Laboratory (MLML) for technical assistance in developing estimates of the total discharges of pollutants into the State's coastal watersheds, bays, estuaries, and coastal waters from all sources. Storm water proved to be the largest contributor of various pollutants to coastal waters. Loads from publicly-owned treatment works (POTWs) have declined sharply since 1971, while storm water loads have remained steady or have increased. The contractors' report, "Pollutant Mass Emissions to the Coastal Ocean of California: Initial Estimates and Recommendations to Improve Storm Water Emission Estimates" (SCCWRP Study), provides 14 recommendations for developing a method to determine the appropriate frequency of monitoring, relative load, and effectiveness of management practices to reduce pollution (Appendix 5).

SCCWRP also prepared the Quality Assurance Project Plan (QAPP) for the SWRCB's coastal water quality monitoring program and the national "Coastal 2000" program. The QAPP provides standard sampling and data collection protocols and a standard format for reporting monitoring results (Appendix 6).

I. INTRODUCTION

Assembly Bill (AB) 1429 (Chapter 899, Statutes of 1997) enacted Water Code Section 13181. The law requires the State Water Resources Control Board (SWRCB) to prepare an inventory of existing water quality monitoring activities within the State's coastal watersheds, bays, estuaries, and coastal waters. The SWRCB completed the inventory and submitted it to the Legislature in October 1998. It is available to the general public at the web site <http://www.sfei.org/camp>.

AB 1429 also requires the SWRCB to prepare and submit to the Legislature by January 1, 2001 a report that proposes the implementation of a comprehensive program to monitor the quality of the State's coastal waters. The pollutants to be monitored must include bacteria and viruses, petroleum hydrocarbons, heavy metals, and pesticides. The law requires that the proposed program utilize available information and avoid the duplication of existing and ongoing monitoring efforts to the extent feasible.

The SWRCB's current coastal water monitoring efforts are limited to the Coastal Fish Contamination Program (CFCP), the State Mussel Watch Program (SMWP), and the investigation of fecal contamination in commercial shellfish harvesting waters as required by the Shellfish Protection Act of 1993. The CFCP focuses strictly on monitoring and assessing coastal areas where sport fishing is a major activity for the assessment of human health risks. The baseline budget for CFCP is 3.0 Personnel Years (PYs) and \$324,000 for contract support by the Department of Fish and Game (DFG). In Fiscal Year (FY) 2000-01, the SWRCB also committed \$143,000 in contract funds to the Office of Environmental Health Hazard Assessment (OEHHA) to conduct human health risk assessments and develop health advisories. The SMWP monitors and evaluates the occurrence of toxic substances in the State's bays, harbors, and estuaries through the analysis of transplanted and resident mussels and clams. The annual budget for SMWP consists of 2.3 PYs and \$250,000 for contract support provided by DFG. In addition to the CFCP and SMWP, an average of \$100,000 in contract funds is expended annually for the studies of bacterial contamination in shellfish harvesting waters. In summary, the total budget for SWRCB's current efforts to monitor and assess coastal water quality is 5.3 PYs and \$817,000 in contract funds.

However, these existing programs are designed to produce information to answer specific questions concerning human health risks related to fish consumption. While they provide a snapshot of water quality conditions in areas monitored, they do not provide a comprehensive overview of the quality of the State's coastal waters, nor do they answer specific questions concerning pollutant emission loads or sources of pollution, as required by AB 1429.

Subsequent to the passage of AB 1429 in 1997, the Legislature enacted AB 982 in 1999. AB 982 requires the SWRCB to assess and report on the State's monitoring programs and to prepare a proposal for a statewide comprehensive surface water quality monitoring program. The SWRCB has since submitted to the Legislature the Proposal for a Comprehensive Surface Water Ambient Monitoring Program (SWAMP). Although SWAMP contains a coastal water monitoring

component, its primary focus is on inland waters. For coastal waters, SWAMP proposes an approach using a probabilistic monitoring on a five-year rotating basis. This approach will provide ambient water quality information on coastal waters and will establish trends in water quality. However, it will not produce other specific information required by AB 1429, such as source identification and pollutants related to storm water emission.

Specifically, AB 1429 requires the proposed comprehensive program to include all of the following:

1. A determination of the extent to which water quality objectives are being met.
2. Sources of pollution where water quality objectives are not being met.
3. Methods for determining changes in coastal water quality over time.
4. An estimate of the total discharge of pollutants from all sources into coastal watersheds, bays, estuaries, and coastal waters.
5. Standard protocols for sampling and data collection.
6. A standard format for reporting monitoring results.
7. An estimate of program costs and an implementation schedule.
8. A method to report biennially to the public on coastal water quality.
9. Recommended actions to maintain and improve coastal water quality.
10. A description of the methods to be used to monitor the mass emissions from storm water.

This report proposes a comprehensive coastal water quality monitoring and assessment program that will provide information related to the above ten topics. Some of the requirements can be partially achieved by utilizing information generated by existing programs, i.e., CFCP, SMWP, National Pollutant Discharge Elimination System (NPDES) Self-Monitoring Program, and federal Clean Water Act (CWA) Section 305(b) Program. Others can be accomplished by implementing SWAMP (e.g., determining changes in water quality over time), and by implementing the Plan for California's Nonpoint Source Pollution Control Program (NPS Plan), and the Best Management Practices (BMPs) required by NPDES storm water permits (e.g., actions to maintain and improve coastal water quality).

Since SWRCB currently lacks comprehensive monitoring information to meet all the requirements of AB 1429, a special study (SCCWRP Study) was also conducted to estimate the total discharge of pollutants into the State's coastal waters, sources of those pollutants, and the contribution of storm water to the pollution. The Study was jointly conducted by the Southern California Coastal Water Research Project (SCCWRP), the San Francisco Estuary Institute (SFEI), and the San Jose State University's Moss Landing Marine Laboratory (MLML).

To estimate the total discharge of pollutants from all sources, the contractors used a model based mainly on rainfall, land use categories, and historic information on water quality of runoff from different land uses. The SCCWRP Study recommended 14 activities (which are discussed in detail in the following chapter) to improve the State's ability to monitor and assess pollutant loads originated from storm water runoff. These 14 activities are an essential part of the proposed comprehensive coastal water quality monitoring program.

Under contract with both the SWRCB and the U.S. Environmental Protection Agency (USEPA), SCCWRP also prepared a Quality Assurance Project Plan (QAPP) for the State's coastal water quality monitoring program and the national Coastal 2000 program. The QAPP provides standard sampling and data collection protocols and a standard format for reporting monitoring results. The SWRCB proposes to use these standard protocols and reporting format for coastal water quality monitoring.

II. POLLUTANT MASS EMISSIONS AND STORM WATER DISCHARGE

Although there are existing regional efforts to monitor the quality of the State's coastal waters, such as the Southern California Bight Project, the San Francisco Estuary Regional Monitoring Program, and SCCWRP, there is no comprehensive statewide data on pollutant mass emissions into coastal waters due to the lack of a comprehensive statewide monitoring program. The increased frequency of beach closures in recent years has elevated concerns over the impact of storm water runoff on coastal water quality. AB 1429 requires the SWRCB to include in the proposed comprehensive program the following:

“A description of the method by which the state board shall develop a system for monitoring mass contaminant discharges, including, but not limited to, heavy metals, PCBs, PAHs, and pesticides from storm water at the point of discharge. The system shall provide for the appropriate frequency of monitoring for each specific contaminant. The system shall be designed to identify the relative contribution of contaminants in storm water to the overall anthropogenic discharges into near coastal waters. To the extent possible, the system shall be designed to determine the effectiveness of best management practices in reducing the discharges of contaminants to near coastal waters.”

To accomplish this task, the SWRCB contracted with SCCWRP, SFEI, and MLML to assist in estimating mass emissions, i.e., the total amount of pollutants discharged into the ocean. The contractors' report, “Pollutant Mass Emissions to the Coastal Ocean of California: Initial Estimates and Recommendations to Improve Storm Water Emission Estimates,” is attached as Appendix 5.

Using existing water quality data collected in the past ten years (1990-1999) by various sources and the average rainfall data collected over 30 years (1961-1990), the Study found that storm water runoff is a significant contributor of pollutants to coastal waters (Table 1). Storm water runoff contributed over 90 percent of the nitrate, cadmium, and lead in southern California. Storm water also contributed the majority of the cumulative load for suspended solids and chromium, copper, nickel, and zinc. Bacteria loads were high regardless of the land use or type of watershed. In many cases, there were not enough data available, especially for the central and north coast, to make adequate estimates of loads. Since there were insufficient data from all sources to compare loads for other nutrients or organic constituents (such as pesticides and petroleum hydrocarbons), the loads were estimated using a rainfall-runoff model. Uncertainty in the estimates of runoff loads are caused by variability in rainfall, lack of data on water quality, and variability of the laboratory equipment or methodology used to detect pollutants (detection limits). Variability in rainfall and water quality values can alter the estimates of statewide loads several-fold.

To address the problem of insufficient data and inadequate load estimates, the Study has recommended methods to improve storm water monitoring, data collection, and runoff load estimates, which are discussed later in this chapter. Those methods will be implemented by the SWRCB and Regional Water Quality Control Boards (RWQCBs) as part of this proposed comprehensive coastal water quality monitoring program.

Table 1. Estimates of total mass emissions (load in metric tons) to California's coastal waters and percent of load by source^{1/}							
Pollutant	Total Load	Percent of Load					
		Runoff	POTWs	Industrial	Dredge	Platform	Power Plants
Suspended Solids	302x10 ⁶	78.8	2.8	0.04	18.0	0.34	<0.01
Nitrate-N	52x 10 ⁶	93.5	6.5	<0.01	0.0	ND ^{2/}	<0.01
Cadmium	15	91.8	6.0	0.10	2.1	<0.01	<0.01
Chromium	400	73.4	1.8	0.18	24.6	<0.01	<0.01
Copper	756	57.3	39.2	0.12	3.3	<0.01	<0.01
Lead	214	91.3	1.8	0.05	6.9	<0.01	<0.01
Nickel	494	74.0	8.6	0.27	17.2	0.01	<0.01
Zinc	1,672	68.6	27.0	0.33	4.1	<0.01	<0.01

^{1/}Adapted from the Report on Pollutant Mass Emissions to the Coastal Ocean of California: Initial Estimates and Recommendations to Improve Storm Water Emission Estimates (Appendix 5).
^{2/}No Data

Mass emissions from NPDES point source discharges, including sewage treatment plants, are well documented. Thus, SCCWRP was able to compare estimates of discharges from sewage treatment plants and storm water from early 1970s to mid-1990s. Although the discharge volumes for sewage treatment plants increased over the 25-year period, the mass emissions of most pollutants from sewage treatment plants decreased by about 95 percent for trace metals and 99 percent for DDT. This decline was the result of sewage treatment plants spending \$5 billion in the past two decades to enhance source control, pretreatment, treatment, and reclamation processes, as well as the prohibited use of some chemicals, such as DDT. Conversely, loads from storm water runoff were similar or increased from the early 1970s to the mid-1990s (Table 2); therefore, the proportion of the total loads attributable to storm water increased from a minor (5 percent or less) to a major portion of emission for most trace metals. In fact, the only pollutants which have been substantially reduced in storm water runoff over time have been those targeted for source reduction, such as lead and DDT. Increases in the load of pollutants coming from storm water is most likely due to increased urbanization within coastal watersheds.

Table 2. Comparison of combined mass emissions from publicly owned treatment works (POTWs) and storm water runoff from 1971-72 to 1995-96 to the southern California Bight. (mt = metric tons; kg = kilograms; L = liters)

Parameters	Unit	Early 1970s			Mid-1990s		
		Combined Total	Percent of Load		Combined Total	Percent of Load	
			Runoff	POTW		Runoff	POTW
Flow	L x 10 ⁹	1,359	5.5	94.5	2,660	35.1	64.9
Susp Solids	mt x 10 ³	552	49.6	50.4	340	77.8	22.2
Nitrate	Mt	1,510	64.9	35.1	3,137	86.7	13.3
Phosphate	Mt	13,710	3.0	97.0	2,310	22.0	78.0
Cadmium	Mt	55	2.2	97.8	2	30.0	70.0
Chromium	Mt	674	3.7	96.3	20	56.9	43.1
Copper	Mt	585	3.1	96.9	96	37.4	62.6
Lead	Mt	301	29.9	70.1	17	71.9	28.1
Nickel	Mt	330	5.2	94.8	44	26.1	73.9
Zinc	Mt	1781	5.7	94.3	263	61.2	38.8
Total DDT	Kg	19,119	0.6	99.4	24	87.7	12.3

Recommendations for Monitoring and Assessing Storm Water

The SCCWRP Study identifies 14 recommendations to improve the ability to monitor and assess pollutant loads from storm water runoff. These recommendations can be grouped into three general categories: (1) fill data gaps, (2) improve load estimates, and (3) improve storm water monitoring for managers to fully utilize load information.

1. Recommendations to Fill Data Gaps

- a. Compile water quality data for northern and central California. Collect additional data on storm water flows, water quality, and land use information.
- b. Monitor agricultural land-use sites. Monitor different agricultural activities throughout the State to obtain representative constituent concentrations from agricultural land use. Currently, only limited data on concentration of pollutants in runoff are available.
- c. Monitor for organophosphate (OP) pesticides. Sample a variety of land uses and a large number of watersheds to assess the extent of OP pesticide contributions statewide.
- d. Install flow gauges at the mouths of representative coastal watersheds. Less than 25 percent of the discharge volume entering the coast is measured with flow gauges. Accurate runoff volumes are needed to estimate mass loadings.
- e. Monitor other sources, such as atmospheric deposition. Assess inputs from sources which are not currently monitored and may contribute large quantities of pollutants.

- f. Develop minimum standards for detection limits statewide. A data gap identified in all three coastal regions of the State was the bias introduced by varying detection limits. Depending on how they were treated mathematically, mass emission estimates varied by orders of magnitude for many constituents.

2. Recommendations to Improve Load Estimates

- a. Create a statewide watershed classification system. A classification system incorporating land use distribution, precipitation, geology, and development can help allow extrapolation among similar watersheds.
- b. Choose a subset of watersheds for evaluation. The classification system should be used to prioritize representative watersheds for detailed, long-term evaluation. These watersheds can be testing grounds for developing improved monitoring and modeling techniques. They can also serve as testing grounds for management actions.
- c. Evaluate more complex watershed models that include environmental fate and transport elements. Several models exist which may be useful, but models must be validated for their applicability to California.
- d. Determine the optimum monitoring design depending on program goals. Additional studies are needed to assess the optimum monitoring design for addressing specific management questions.

3. Recommendations to Improve Storm Water Monitoring for Managers to Fully Utilize Load Information

- a. Form regional storm water monitoring networks to increase comparability among monitoring programs, pool resources, and share information. Many issues are regional in nature and networking can serve as a tool for cost-effective research, cost sharing, and improved information exchange.
- b. Link storm water discharges and beneficial use impacts. Assess whether storm water discharges are resulting in beneficial use impairments. Ambient monitoring can determine if the potential risk is resulting in real water quality impacts.
- c. Refine tools that assess anthropogenic (resulting from human activities) versus natural loads in storm water. This may be particularly important for developing Total Maximum Daily Loads (TMDLs) for trace metals.
- d. Refine tools for assessing biological impacts in receiving waters. Monitoring agencies and regulators need a way to assess if storm water discharges are impacting aquatic biota in receiving waters.

III. REQUIRED PROGRAM ELEMENTS

AB 1429 requires that the proposed comprehensive coastal water quality monitoring program include ten specific elements. The following describes in detail how these elements will be accomplished by SWRCB and RWQCB staff:

- 1. A determination of the extent to which existing water quality objectives, sediment quality guidelines, tissue contaminant burden guidelines, and health standards are being met.**

Currently, the SWRCB lacks comprehensive monitoring information to make such a determination on the statewide basis. The biennial report submitted to the USEPA pursuant to the CWA Section 305(b) provides information on the extent to which existing water quality objectives, standards, and guidelines are being met in a statewide overview. A copy of the 305(b) Report is attached as Appendix 2. As additional coastal monitoring data are generated, the 305(b) Report will include the results of the assessment.

The proposed SWAMP will also provide information on the ambient water quality in coastal waters. SWAMP also proposes to maximize the use of available data generated by other monitoring programs, including compliance monitoring data; regional monitoring efforts such as SCCWRP, SFEI, and the Interagency Ecological Program (IEP); and other monitoring by federal, State and local agencies, volunteer groups, and university efforts.

- 2. A determination regarding the sources of pollution in areas where objectives, standards, and guidelines are not being met.**

This requirement can be satisfied by the existing federal programs that are implemented by the SWRCB and RWQCBs, i.e., CWA Section 303(d) listing and the TMDL processes. Section 303(d) requires the states to compile a list of waters that do not meet water quality standards after technology-based limits are implemented. The Section 303(d) list identifies the pollutants causing the impairments and the sources of those pollutants for specific water bodies. The current 1998 Section 303(d) list will be reviewed and updated in year 2002.

Federal law requires that TMDLs be established for each impaired water body on the Section 303(d) list. A TMDL must account for all sources of the pollutants that caused the water body to be listed. The RWQCBs are currently working on developing over 120 TMDLs, many of them for bays, estuaries, and coastal waters, including San Francisco Bay, Morro Bay, Malibu, Santa Monica Beaches, and San Diego Bay.

- 3. Methods for determining the degree of improvement or degradation in coastal water quality over time.**

There has not been a comprehensive effort to monitor coastal waters on a long-term basis to determine the changes in water quality over time due to the lack of resources. The proposed SWAMP describes a sampling design for assessing status and trends of coastal and inland

water quality. SWAMP lays out monitoring objectives and sampling design elements for evaluating how adequately beneficial uses are being protected. It describes a detailed approach to evaluating statewide status and trends in water quality. The proposed program includes a matrix of the appropriate water quality indicators to establish the trends in protecting various beneficial uses. It also includes an approach for developing a consistent set of data evaluation criteria critical to the determination of whether a water body's water quality is improving or declining. These approaches are recommended for monitoring long-term trends in both inland and coastal waters. A copy of the proposed SWAMP is attached as Appendix 3.

4. An estimate of the total discharge of pollutants from all sources into coastal watersheds, bays, estuaries, and coastal waters.

The SCCWRP Study mentioned in the previous chapter details the total discharge of pollutants from all sources. The SCCWRP Study also includes recommendations for improving the methods to estimate emissions. A copy of the SCCWRP report is attached as Appendix 5.

5. Standard protocols for sampling and data collection to maximize the usefulness of the data resulting from the program.

The QAPP prepared by SCCWRP for the SWRCB and the national Coastal 2000 program describes standard operating procedures for sampling and data collection, as well as laboratory activities to ensure accuracy, precision, and representativeness of receiving water monitoring. Guidance methodology and acceptability criteria are established for adequate field sampling of sediments and water column parameters, and a performance-based approach is used for laboratory analysis. Only general guidance is given for how to analyze samples, but strict data quality objectives are established for constituents to be measured, maximum reporting limits, calibration requirements, and specified levels of analytical precision and accuracy. A copy of the QAPP is attached as Appendix 6.

The SWAMP proposed by the SWRCB describes the elements of the quality assurance/quality control protocols for collection and assessment of the highest quality monitoring data. SWAMP also outlines the information management protocols. A key feature of SWAMP is that all data will be easily available to the public and other interested parties via the SWRCB's web site on the Internet.

6. A standard format for reporting monitoring results which maximizes access to and use of the data.

The QAPP also contains an extensive system of data reporting quality control checks and is supplemented with an Information Management Plan (IMP). The IMP details the data management system, including database structure, lists of mandatory variables, and other data requirements. The IMP is focused on standardized file transfer protocols that maximize data sharing among agencies and the public including USEPA's STORET and Environmental

Monitoring and Assessment Program (EMAP) System, and the Southern California Bight Regional Monitoring System. This format assures that data can be easily accessed and downloaded over the Internet.

7. An estimate of program costs and implementation schedule.

This proposed comprehensive coastal water monitoring and assessment program as required by AB 1429 consists of three major components: (1) continued implementation of the existing programs mentioned above; (2) implementation of the coastal water monitoring component of SWAMP; and (3) implementation of the 14 activities recommended by the SCCWRP Study.

The monitoring and assessment activities currently being implemented under existing programs are and will continue to be funded by each individual program contingent upon approval in the annual Governor's Budget. These programs include the CFCP, SMWP, and investigation of bacterial contamination in commercial shellfish harvesting waters as required by the Shellfish Protection Act of 1993. The total budget to support these programs is 5.3 PYs and \$817,000 in contract funds.

The SWAMP prepared by the SWRCB contains detailed cost estimates for monitoring coastal and inland waters. SWAMP, which is currently under review, proposes a continuous program which would divide all monitored locations into five areas and would collect data from the same locations every five years to establish trends in water quality.

The contract with SCCWRP required the Study to identify the activities to improve the State's ability to monitor and assess pollutant loads originated from storm water runoff, and to provide an cost estimate of those activities. SCCWRP recommended 14 activities which would cost \$74.54 million over a 10-year period. The attached SCCWRP Study (Attachment 5) contains detailed description of its cost estimates and implementation schedule.

8. A description of the method to report biennially to the public on coastal water quality.

The SWRCB submits a water quality assessment report to the USEPA every two years pursuant to CWA Section 305(b). This report describes the status of water quality of rivers, streams, lakes, and other water bodies, including the groundwater of the State. The report is available to the public through the SWRCB's web site. Hard copies are also available to public and other interested parties upon request. In addition, as proposed in SWAMP, all future monitoring data will be easily accessible via the SWRCB's web site.

9. Recommended actions to maintain and improve coastal water quality.

Discharge of pollutants from point sources have significantly decreased since the enactment of the federal CWA, the State Porter-Cologne Water Quality Control Act, and the implementation of the NPDES permit program. As indicated in the SCCWRP Study, storm

water runoff has become the significant contributor of pollutants to coastal waters. California began implementing the NPDES Storm Water Program Phase I in 1991 and is currently preparing for the issuance of permits under Phase II of the Program. Unlike the point source pollution control programs which rely on treatment of the waste stream to improve water quality, the storm water program relies on the reduction of pollutants at the source through the implementation of effective BMPs and public education. Therefore, it will take a long period of time for the storm water program to demonstrate clear effect on water quality improvement.

To maintain and improve coastal water quality will require continued efforts to control pollution from storm water runoff and other nonpoint sources. As part of this proposed coastal water quality monitoring program, the SWRCB recommends the implementation of the BMPs prescribed in storm water permits to reduce pollution carried by storm water runoff and the implementation of management measures identified in the NPS Plan to control nonpoint source pollution. A copy of the NPS Plan is attached as Appendix 4.

- 10. A description of the monitoring methods to be used to monitor the mass emissions from storm water including (a) the frequency of monitoring for each contaminant, (b) identification of the contribution from storm water, and (c) methods with which to determine the effectiveness of BMPs in reducing discharges to coastal waters.**

The SCCWRP Study provides recommendations for developing a method to determine the appropriate frequency, relative load contribution of each contaminant, and effectiveness of BMPs. The Study estimated statewide mass emissions from storm water flows with a model that extrapolated information from small areas to larger watersheds. The model was used because of insufficient data on concentrations of contaminants in storm water runoff from most coastal watersheds. The modeling approach can be used to assess changes in mass emissions under various scenarios, such as variations in rainfall, increased watershed development, and implementation of best management practices. The SCCWRP Study recommends improvements to modeling and storm water monitoring, including a study to assess the effectiveness and efficiency of storm water sampling.

IV. CONCLUSIONS

This report describes a means to implement a comprehensive program of monitoring and assessment of the quality of the State's coastal waters that will accomplish the ten directives of AB 1429. The proposed program consists of the continuation of several existing monitoring programs, adoption of standard protocols and reporting format identified in a recently developed national QAPP for monitoring coastal waters, as well as the implementation of new activities described in the proposed SWAMP and the recommendations of the SCCWRP Study. Specifically, the proposed program contains the following:

- Implementation of the coastal water monitoring portion of the Surface Water Ambient Monitoring Program described in Appendix 3. SWAMP also proposes to maximize the use of available data generated by other monitoring programs, including compliance monitoring data; regional monitoring efforts such as SCCWRP, SFEI, and IEP; and other monitoring by federal, State, and local agencies, volunteer groups, and university efforts.
- Implementation of the "Plan for California's Nonpoint Source Pollution Control Program" described in Appendix 4 and implementation of the BMPs prescribed in the storm water permits to improve the quality of coastal waters by reducing the impact of NPS pollution and storm water runoff.
- Continuation of CWA Section 305(b) and Section 303(d) reporting. The reports required by these federal programs provide a statewide overview of the extent to which existing water quality standards are being met, as well as a statewide list of impaired water bodies and the pollutants causing the impairments.
- Continuation of the NPDES discharger self-monitoring program. The information collected from the program can be used to estimate pollutant loads from point source discharges in coastal waters.
- Implementation of the QAPP described in the SCCWRP QAPP and the SWAMP.
- Implementation of the 14 activities recommended by the SCCWRP described in Chapter II of this report, to fill data gaps, improve load estimates, and improve managers' abilities to utilize load information.